chipKIT MX7 Board Details

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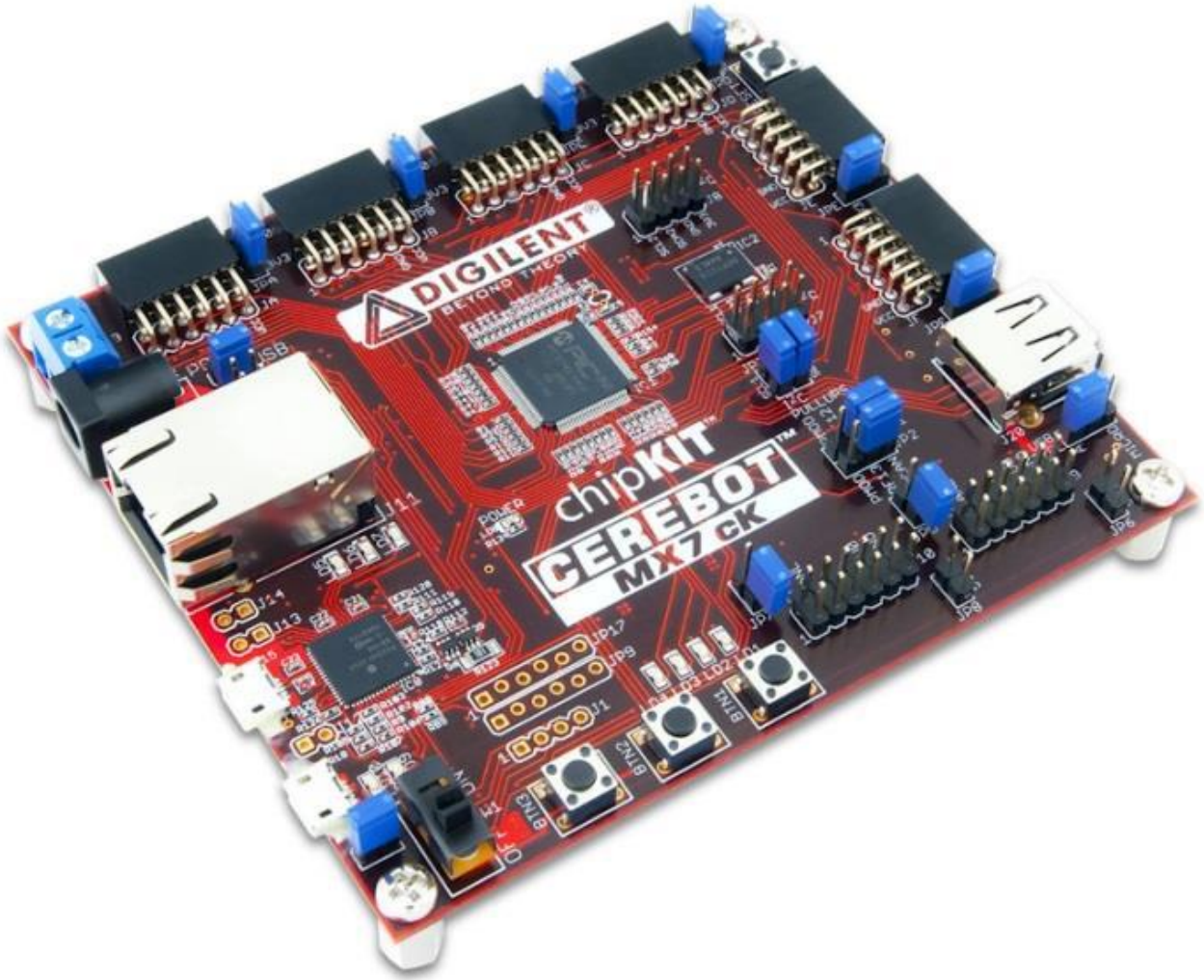
chipKIT MX7 Board



chipKIT MX7 Board

- The board provides 52 I/O Pins for peripheral including:
  - USB Controller
  - 2 – UARTS
  - 3 – SPI Interfaces
  - 2 – I^2C Interfaces
  - 5 – PWM Outputs
  - 5 – External Interrupt Inputs
  - Digital I/O pins of which 10 can be configured as Analog inputs
  - 3 – Input Capture Interfaces

chipKIT MX7 Board Characteristics

- The board power is provided by:
  - The debug USB Controller
  - An external power source

Jumper J3 must be configured appropriately

chipKIT MX7 Connectors & Cables

- PMOD Connectors:
  - JA - JF
  - Two rows of 6 pins each
  - Four signals, Power, & Ground on each row
  - Associated peripheral power jumpers must be set to power external devices (JPA – JPK)

Pin assignment details are given in Appx C of MX7 Ref Manual

- PMOD Cables.
  - Standard cables are pin-to-pin
  - UART cross-over cables required for UART modules

Using the MX7 with MPLAB IDE

- The PIC32 in-system programming/debugging interface uses two pins on the microcontroller.
- These devices support two alternate pin pairs for this interface: PGC1/PGD1 or PGC2/PGD2.
- The PGC2/PGD2 pair is used by default. Due to conflicting uses of microcontroller pins, the Digilent Pro MX7 uses the PGC1/PGD1 pair of pins.
- It is necessary to select the use of PGC1/PGD1 for the debugging interface.
- The following statement MUST be used to configure the microcontroller for the on-board licensed debugger circuit:

#pragma config ICESEL = ICS_PGx1

chipKIT MX7 Digital I/O Devices

- For our initial experiments, we will use on-board devices connected to digital I/O lines:
  - Inputs Port/Pin

BTN1	RG6	Port G Bit 6
BTN2	RG7	Port G Bit 7
BTN3	RA0	Port A Bit 0

  - Outputs Port/Pin

LD1	RG12	Port G Bit 12
LD2	RG13	Port G Bit 13
LD3	RG14	Port G Bit 14
LD4	RG15	Port G Bit 15

Using BTN 3 on the MX7 Board

- Pmod port JF, pins 8, 9, and 10 are connected to the signals TCK/RA1, TDI/RA4, and TDO/RA5 respectively.
- Button BTN3 is connected to the signal TMS/RA0 on the PIC32 microcontroller.
- These microcontroller pins are shared between general purpose I/O functions and by the JTAG controller.
- The JTAG controller is enabled on reset, so these pins are not available for general purpose I/O and BTN3 is not useable as a button input until the JTAG controller is disabled.
- The following statement can be used to disable the JTAG controller:

DDPCONbits.JTAGEN = 0;

Microcontroller Clock Sources & Outputs

- With the PIC32MX795 Microcontroller clock system, there are five possible clock sources:
  - Two use internal oscillators
  - Three require external crystals or oscillator circuits

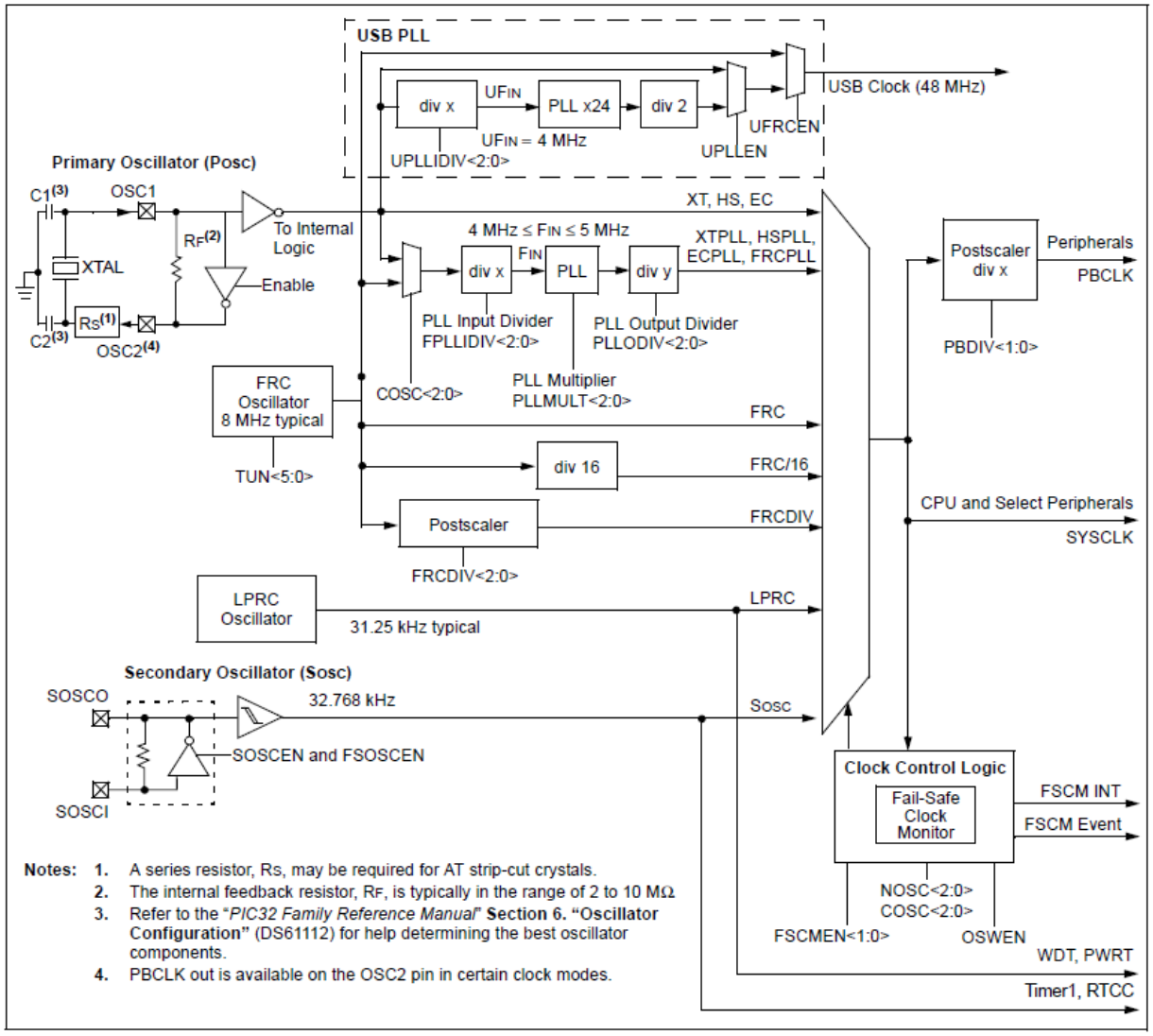
- With the clock system, there are three clock outputs:
  - CPU System Clock
  - USB Clock
  - Peripheral Bus Clock

Clock Source Details

- Clock Sources:
  - FRC – Fast RC Oscillator – 8 MHz
  - LPRC – Low Power RC Oscillator – 32 KHz
  - POSC – Primary High-speed Oscillator – requires a crystal up to 20 MHz
  - SOSC – Secondary Low-Speed High Accuracy Oscillator – Uses a 32,768 Hz crystal
  - EC – External clock source with no crystal

PIC32 Clock System

FIGURE 8-1: PIC32MX3XX/4XX FAMILY CLOCK DIAGRAM



Notes:
1. A series resistor, Rs, may be required for AT strip-cut crystals.
2. The internal feedback resistor, RF, is typically in the range of 2 to 10 MΩ
3. Refer to the "*PIC32 Family Reference Manual*" **Section 6. "Oscillator Configuration"** (DS61112) for help determining the best oscillator components.
4. PBCLK out is available on the OSC2 pin in certain clock modes.

MX7 Board Clock Options

- The MX7 Board is equipped to use either an installed 8 MHz silicon resonator with the EC configuration, or an external crystal with the XT configuration.

- With the resonator, it is possible to configure the clock system to produce CPU operating frequencies to 80 MHz.